

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Takashi MIYAKAWA et al.

Group Art Unit: 1732

Application No.: 10/717,502

Examiner: M. EASHOO

Filed: November 21, 2003

Docket No.: 117848

For: PROCESS FOR PRODUCTION OF FORMED HONEYCOMB BODY, AND
HONEYCOMB STRUCTURE

REQUEST FOR RECONSIDERATION AFTER FINAL REJECTION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In reply to the December 4, 2006 Office Action, reconsideration of the rejection is respectfully requested in light of the following remarks.

Claims 1-10 and 13 are pending in this application, the only independent claim being claim 1.

I. The Claims Define Patentable Subject Matter

The Office Action rejects claims 1-10 and 13 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,851,376 (Asami) in view of JP55-152011 (JP55). This rejection is respectfully traversed.

Independent claim 1 recites a "process for producing a formed honeycomb body, the process comprising: mixing, by a mixer, a raw material for forming a honeycomb body structure containing at least a ceramic raw material powder, a binder and water, to obtain a compounded mixture for forming a green body; adding a predetermined amount, to the raw

material for forming the honeycomb body, a powdery material obtained by crushing, into a maximum particle diameter of 50 mm or smaller, a crushed green body having substantially same composition as the compounded mixture for forming the green body, the crushed body being obtained from a rejected product of an undried formed material, and a resulting mixture is mixed thoroughly by the mixer to obtain the compounded mixture for forming the green body; and kneading and extruding the compounded mixture for forming the green body into a honeycomb shape by a continuous extruder, to obtain the formed honeycomb body; wherein the mixer includes a hoe that rotates at a low speed and a chopper having a cross-shaped blade that rotates at a high speed" (emphasis added).

The Office Action fails to specifically address the claimed mixer including "a hoe that rotates at a low speed and a chopper having a cross-shaped blade that rotates at a high speed." Instead, the Office Action gives official notice that "the use of either a single screw, twin screw extruder, [and] a mixer having a hoe is well known in the art." Further, the Office Action gives official notice that "optimizing the operating speed of a mixer or extruder is also well known in the extrusion art." Even if these assertions are correct, they do not satisfy the legal requirements of an obvious analysis, as explained below.

Further, if this "official notice" continues to be relied upon, Applicants request that a reference be provided, because Applicants challenge the assertion that such features were known in the context of the claimed invention.

Additionally, as acknowledged by the Office Action, Asami fails to teach or suggest "the mixing of undried reclaimed material with a raw ceramic material." The Office Action relies on JP55 to teach such a feature and alleges that it would have been obvious to combine Asami with JP55 because: 1) Asami teaches adding water to a dried reclaimed material in order to reduce the mechanical impact on the particles; and 2) one of ordinary skill in the art would have been motivated to combine Asami and JP55 to eliminate an undesired process

step, such as drying (see MPEP § 2144.04) because Asami teaches that adding water is beneficial and JP55 shows that drying is not required. These assertions are based on incorrect premises, and/or are otherwise improper as explained below.

1. The Applied Prior Art Does Not Teach or Suggest "A Hoe That Rotates At A Low Speed And A Chopper That Rotates At A High Speed"

The Office Action takes official notice that the use of a mixer having a hoe is well known in the art. Further, the Office Action takes Official Notice that optimizing speed is well known in the extrusion art. The taking of official notice is respectfully traversed.

As noted in MPEP §2144.03, it "is never appropriate to rely solely on 'common knowledge' in the art without evidentiary support in the record, as the principal evidence upon which a rejection was based." The ceramic molding arts, in certain instances, may use a mixer having a hoe or a single or twin screw extruder. However, the Office Action fails to indicate how the use of these instruments in the context of the claimed invention is common knowledge or well-known in the art.

The Office Action also fails to provide evidence as to how a mixer including the claimed "a hoe that rotates at a low speed and a chopper having a cross-shaped blade that rotates at a high speed" is well known in the art, or that such a mixer even exists.

Additionally, the Office Action's alleged motivation of using a mixer having a hoe in order to "provide a stable product wherein damage to the material is not caused by excessive mixing shear" is actually contrary to the "chopper . . . that rotates at a high speed" feature of claim 1. The claimed invention does not seek to reduce excessive mixing shear; rather a mixer with a hoe that rotates at a low speed would allow raw material to be stirred by the hoe, and a cross-shaped blade rotating at a high speed would allow raw material to be made fine by chopping of the blade. See, e.g., paragraph [0028]. One of ordinary skill in the art would recognize that the cross-shaped blade rotating at a high speed would increase shear, not

reduce it, and therefore clearly would not have been motivated to make the claimed invention, if the goal were to reduce mixing shear as alleged by the Office Action.

2. That Office Action's Analysis Improperly Contains Different Embodiments Of Asami

The Office Action asserts that Asami teaches that adding water to dried unclaimed material is beneficial because it reduces impact to the particles. However, such a teaching is (A) taken out of context, and (B) would not have been applicable to the context of the claimed invention, in which crushing is used, because "reducing impact" is incompatible with "crushing."

Asami teaches lightly smashing the unfired scrap under a relatively small mechanical impact to reduce damage. As a separate embodiment, Asami also teaches an alternative to the mechanical impact is adding water to dried, unfired shaped scrap so that the scrap is available in the form of a slurry or green batch so as to divide the scrap into particles. The slurry is then screened or sieved. See col. 8, lines 45-59. Thus, Asami does not teach adding water to a dried reclaimed material in order to reduce the mechanical impact on the particles that have been crushed, as suggested in the Office Action; rather, adding water to the reclaimed cordierite allows for dividing particles of dried unclaimed material by adding water without applying mechanical impact (i.e. not crushing, as claimed in claim 1). Even with the addition of water, the particles are still particles made from dried unclaimed material. Moreover, the addition of water creates a "slurry," which is clearly different from the "powdery material" of the claimed invention.

Additionally, as noted in paragraphs [0006]-[0008] of Applicants' specification, the use of a dried formed material like that in Asami causes several problems. For example, fist-sized lumps are created and a non-uniform mixture is obtained, creating defects such as voids, bending, and cell deformation in the formed body.

3. The Proposed Modification Would Add, Not Eliminate A Process Step

The Office Action alleges that one of ordinary skill in the art would have been motivated to combine Asami and JP55 because Asami teaches that adding water is beneficial and JP55 shows that drying is not required, and thus, the combination of Asami and JP55 eliminates an undesired process step, such as drying. Such a conclusion is incorrect because "adding water" to the "dried" formed material of Asami is adding, and not eliminating, a process step.

Further, JP55 discloses a punching method wherein chip-like articles are obtained by punching a kneaded material. A pottery raw material having moderate amount of water is extruded by a vacuum extruding machine, and part of the pottery raw material extruded from the vacuum extruding machine is returned back to the process before kneading to facilitate kneading of the raw pottery material so as to decrease distortion. The kneaded material contains materials that remains after punching, such as punched residues collected after punching with a kneader. Thus, JP55 does not disclose mixing a rejected product of an undried formed material, as claimed. Rather, it simply removes and re-adds material to facilitate kneading. Further, JP55 discloses a method which is free from the formation of the lumps in the green body to be extruded from an extruder, and thus does not teach or suggest the problem solved by embodiments of the claimed invention. Moreover, JP55 does not teach or suggest formation of through channels as cells, which is a requisite element of a honeycomb green body. As a result, there would have been no motivation to combine JP55 with Asami.

4. The Office Action Has Failed To Present Evidence That The Allegedly Optimizable Variables Were Recognized As Result-Effective Variables In The Prior Art.

While only routine skill in the art may be required to discover an optimum value of a recognized result-effective variable, the relative ratios of claims 3 and 4 are not recognized in

the prior art as a result-effective variable. The Office Action asserts that it would have been obvious to have optimized the relative ratios of reclaimed material to raw materials through routine experimentation, because it has been held that discovering an optimum value of a result-effective variable involves only routine skill in the art. However, MPEP §2144.05(II)(B) states that "a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation" (emphasis added).

Therefore, to support the assertion in the Office Action that the recited ratio of "wherein the crushed green body is added in an amount about 30 parts by mass or less relative to about 100 parts by mass of the ceramic raw material powder" would have been obvious through optimization of a result-effective variable, the prior art must first teach or suggest that the amount of crushed green body obtained from a "rejected product of an undried formed material" is known to be a result-effective variable.

The cited prior art does not recognize that the recited ratio is a result-effective variable. As discussed above, the cited prior art does not disclose the use of a "rejected product of an undried formed material." Accordingly, the only indication of record, of a ratio of crushed green body to ceramic raw material powder exists in Applicants' own disclosure, and strongly suggests improper hindsight reasoning has been applied.

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In summary, the rejection is improper for at least the reasons discussed above. Thus, withdrawal of the rejections of the claims is respectfully requested.